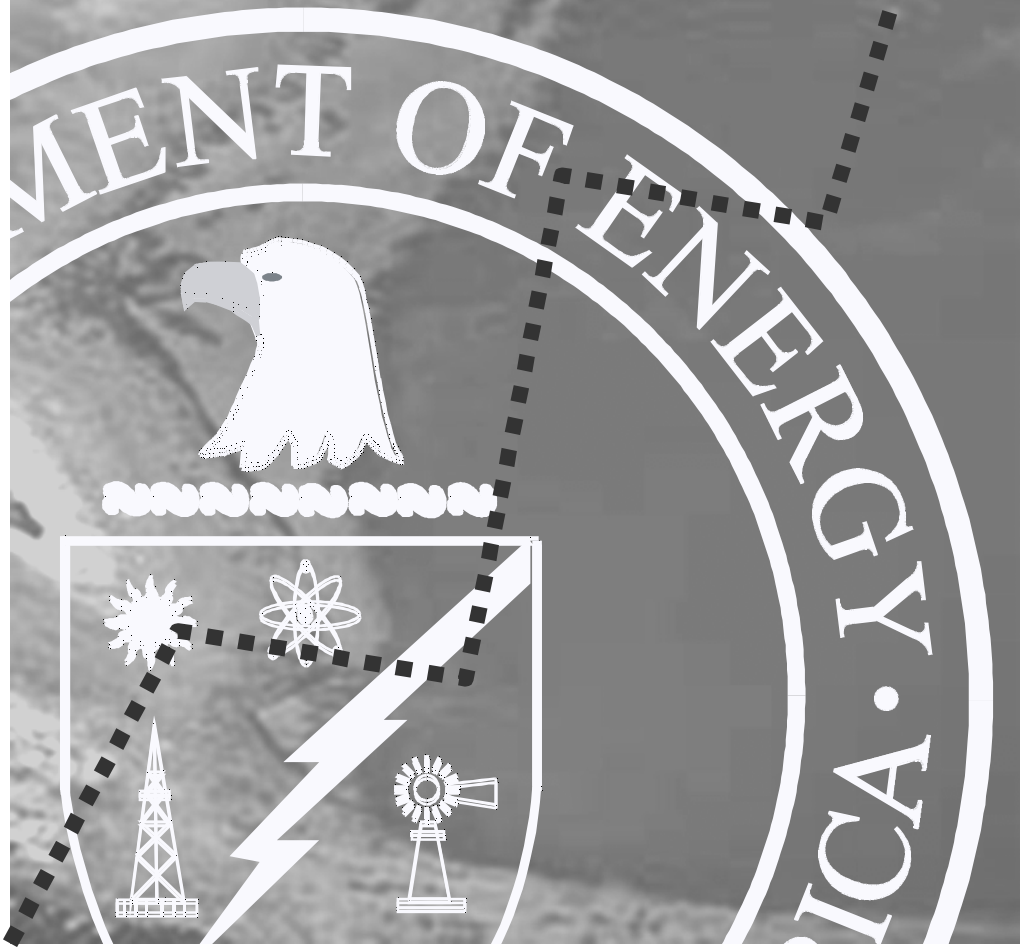
U.S. Department of Energy

Office of Management, Budget and Evaluation

Performance Baseline Development and Validation



Initiated by: Office of Engineering and Construction Management

PERFORMANCE BASELINE DEVELOPMENT AND VALIDATION

1.0 OVERVIEW

Each project shall have a formally approved and communicated Performance Baseline (PB) that describes the integration of the technical objectives and requirements with the schedule and cost objectives. The baseline is included or referenced in the Project Execution Plan. At Critical Decision-1, Approve Alternative Selection and Cost Range, a preliminary baseline range is adopted by the project until it is replaced by the performance baselines at Critical Decision-2, Approve Performance Baseline. The technical, schedule, and cost processes are the three key elements used to establish an integrated approach to the PB.

The principle reasons for establishing, approving, controlling and documenting a PB are to:

- Ensure achievement of project objectives.
- Manage and monitor progress during project execution.
- Define the project for approval and authorization by the DOE, by the Office of Management and Budget (OMB), and by Congress.
- Ensure accurate information on the final configuration (as-built drawings, specifications, expenditures, etc.).
- Establish performance measurement criteria for projects.

Development of the PB begins with the planning cost, schedule estimates, and the preliminary scope included in the mission need statement, and is further defined in conceptual design documents. All capital asset projects are required to have their PBs independently reviewed through an independent cost review or Independent Cost Estimate if required, which addresses the technical, schedule, and cost baselines.

All DOE projects with a total project cost (TPC) over $5M, regardless of funding type, must be reaffirmed as part of the annual budget validation process. A tailored approach will be used to assess readiness to proceed and the ability to use planned funding. General plant projects, capital equipment projects, and operating expense-funded projects having a TPC less than $5M are the validation responsibility of the operations or field office managers. The DOE-Office of Management, Budget and Evaluation (OMBE) Controller will issue, as necessary, DOE project validation guidance annually through the Budget Call for the coming year.

The Office of Engineering and Construction Management is responsible for coordinating and conducting all project Independent Cost Review/Independent Cost Estimate baseline verifications/validation reviews for projects having a TPC greater than $5M.

2.0 PURPOSE

A project PB describes a desired end product and associated schedules and costs.

Project PBs are reaffirmed at each major decision point and at each "critical decision," especially prior to committing significant resources. In addition, baselines should fit into the Congressional budget cycle to ensure the information submitted is accurate and current.

The level of detail involved in developing a PB depends on the project. A tailored approach should be used commensurate with:

- The size and complexity of the project.
- The uniqueness of the project, the use of new versus proven components and processes, and project visibility and sensitivity.
- The extent to which the activity is already covered by contractual requirements and other risks.

A tailored approach is used to ensure that excessive, inefficient, or inappropriate management requirements are not imposed on a project. Large and complex projects (i.e., major systems) usually require highly developed baselines. Smaller projects usually require lesser detail.

A credible, independent review of each project baseline is an expectation of Congress, OMB, stakeholders, and the DOE. PB verification (validation) is a one-time event. Once a PB is verified (validated), it should not generally require revalidation if changes are managed through a rigorous change control process. Completion of a rigorous external independent verification review should reduce the need to subject the project to additional resource-consuming audits and reviews by other organizations.

3.0 APPLICATION

3.1 Performance Baseline Development

A project PB contains three elements:

- The technical baseline
- The schedule baseline
- The cost baseline.

The technical baseline is developed first and describes the desired configuration: technical, schedule, and cost performance, and characteristics of the end product. Key Performance

Parameters (KP) are used to represent the PB. The scope of work necessary to provide the end product is determined using the technical baseline. The scope of work is divided into elements that become the work breakdown structure (WBS). The scope is the basis for developing the schedule and cost baselines. These three baselines are tightly coupled. A change in one baseline generally affects one or more of the others. The WBS itself is hierarchical in the sense that each element in a WBS may be subdivided and become the basis for the next lower, more detailed WBS level (see the Practice on WBS).

Initially, few details are available. They may include only the performance directly related to program mission, some bare specifications, and an outline of the technical approach. During concept development, details are added, including end products and critical subsystem specifications and drawings. For environmental cleanup, the initial performance and specification details will focus on cleanup standards, requirements, and the regulatory and compliance drivers involved.

The technical baseline is the reference set of high-level technical documents that contain the technical requirements necessary to satisfy mission needs. The schedule baseline is the set of approved milestones derived from, and consistent with, the technical logic. The schedule milestones are traceable to elements within the WBS. The cost baseline is developed by allocating resources and estimated costs against the scheduled activities for the total scope of work. The cost baseline supports the technical work scope, is traceable to the WBS, and is time-phased and aligned to the schedule baseline and mission elements.

Baselines are controlled through the application of the configuration management and baseline change control processes, and will evolve as the project matures.

Baseline details and precision increase as a project progresses. For a conventional system project, such phases generally include Initiation, Definition, Execution, and Transition/Closeout. Project engineering and design funds become available for the preliminary and final design and baseline development. Projects with a TPC greater than $5M require an external independent review verification of PB (Critical Decision-2). For environmental restoration projects, this is usually assessment and design. During early project phases, baseline development may—if schedules or costs do not meet expectations—require re-determination and rescheduling of the technical baseline or scope of work. During operations and project closeout, there is seldom any change to the baseline or the level of detail.

3.1.1 Technical Baseline Development Process

The technical baseline development process requires management action to formally establish the project mission, functional objectives, design or characterization requirements, and specifications in order to define, execute, and control the project scope of work (Figure 1). The technical requirements are the basis for development of the project's WBS, cost estimate, schedule, and performance reports.

The contractor must establish a technical baseline from which work can be accomplished and performance measured. The contractor's technical baseline is developed after the project's mission, technical objectives, and functional requirements (or equivalent objectives such as environmental assessment requirements) are established by the PD/PM and included in project documentation, e.g., PEP. The formally approved technical objectives and requirements are baselined at Critical Decision-1. The technical baseline and work scope definition guideline requires that the contractor's technical baseline be contained in formal documentation, such as a conceptual design report, associated drawing, or an environmental cleanup work plan, and is approved by the DOE. This is the point from which technical aspects of the contract work will be subject to formal change control.

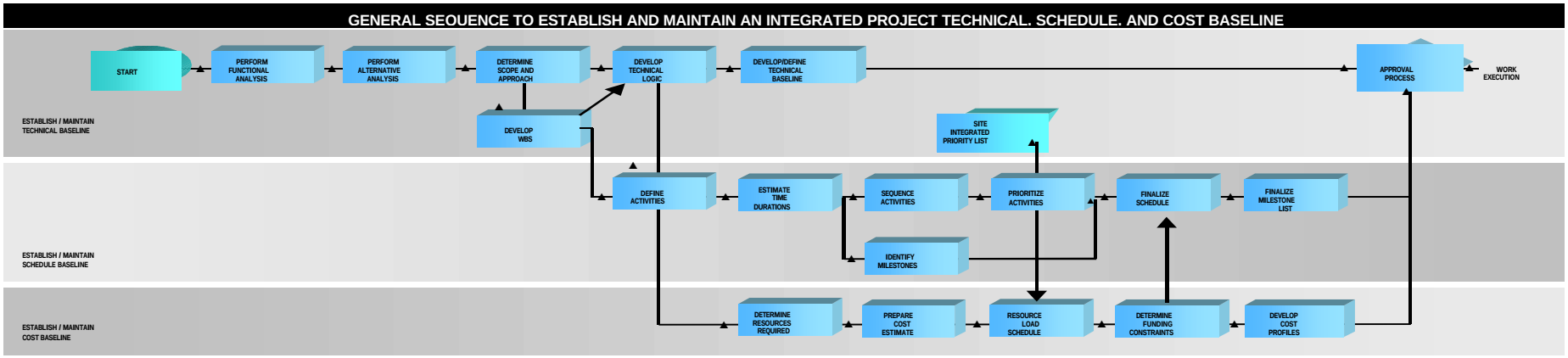


Figure 1. General Sequence to Establish and Maintain an Integrated Project Technical, Schedule, and Cost Baseline

All authorized project work is defined in a WBS that represents the way the work will be estimated, scheduled, budgeted, performed, and managed. The WBS is maintained consistent with project needs throughout the life of the project, ensuring changes to the WBS are made within a formal change control process.

All projects should have a clearly defined work scope to accomplish the DOE prescribed scope baseline. The work scope should be described in sufficient detail to ensure that functional design requirements, major physical attributes, and performance characteristics are clearly accomplished.

Project risk factors are considered when developing the WBS. The primary purpose of the WBS is to divide and organize work into manageably sized units. Requiring added levels of the WBS will in turn require a further division of the work into progressively smaller units, which may be required on more complex projects of higher risk.

The technical baseline is established such that scope performance can be measured and controlled throughout the life of the project. Monitoring and controlling scope performance involves tracking the achievement of the technical baseline at the contractor level. The technical baseline is hierarchically related, such that monitoring scope performance at the contractor level is directly related to accomplishment of the higher level DOE-controlled PBs. The technical baseline also relates to the schedule and cost baselines to allow technical performance monitoring to correlate with cost and schedule monitoring.

Changes to the WBS should not be made once work has started, although sometimes changes are necessary to make corrections. Some WBS changes, such as splitting work scope into multiple WBS elements, may cause a significant disruption to the project control system if some of the work has already been performed and actual costs incurred. Changes to the WBS normally result as a project progresses through design, procurement, construction, test, operation, etc., and when project re-scoping occurs. An example of expected changes to the WBS would be the expansion of WBS elements as future work becomes more definite. Another example would be the aggregation of the WBS elements in the same leg of the structure, if less detail is required to effectively manage the work.

The work defined in the contract scope of work, and subsequently organized in the WBS, should be assigned to the specific control account managers in the organizational elements that are responsible for managing and performing the work.

The control account manager(s) should be identified as early as possible to permit participation in the planning and scheduling process. The schedule developed for performing the work should involve the responsible control account manager. The schedule developed by the control account manager will define the work approach and sequencing with activity logic, and identify the resources estimated to complete the work within the activity durations assigned. The project is to have the control account manager assigned before the work begins.

3.1.2 Schedule Baseline Development Process

When establishing the schedule baseline, all known requirements affecting a project are identified and considered in the development of project baselines. All project work is scheduled using a disciplined, integrated approach.

Schedules are developed consistent with the WBS and integrated with the cost estimate, and represent all project work scope regardless of funding source. Activity logic is developed to depict all work scope, constraints, and decision points. Time durations are estimated and assigned to activities representing work accomplishment. Development of schedules is in concert with the WBS, such that all work is represented in the schedule, and accurate durations are established.

Schedule activities should be traceable to the cost estimate and the WBS. Schedule activities, durations, and sequencing relationships are conceptually developed in conjunction with development of the project cost estimate. The cost estimate is generally calculated below the lowest level of the WBS and provides a means for estimating activity durations.

Activities and logic should be planned by theWBS element first, to permit the checking of activities and logic with the WBS element scope of work and technical requirements. After determining that adequate activity planning against the WBS element has been accomplished, integration of activity logic between WBS elements is performed. Logic links should be developed thoroughly enough to allow an accurate critical path to be calculated in order to serve as the basis for forecasting and decision-making throughout the life of the project.

A tailored approach should be used when determining how much detail to include in the schedule. Basic guidance for determining the extent of activity detail is that the number of activities should not be so few as to prevent suitable progress tracking, and not so numerous that the number of activities overwhelms the system and its users—rendering the schedule logic incomprehensible and too burdensome to status.

An approved schedule baseline should be established that clearly depicts critical path activities and milestones from which actual performance for all activities and milestones can be compared, and from which forecast data can be generated. Resource-loaded activities, as required and at the appropriate level, will be used to develop time-phased budgets that are integrated with the schedule. Only approved changes to the schedule baseline will be permitted.

Project schedule activities (not milestones) should be resource-loaded to facilitate analyses of "what if" funding scenarios. Resource-loaded schedules assist the PD/PM in developing time-phased budgets and spending profiles. On projects using critical-path method schedule networks, schedules should be resource-loaded at a summary level; resource loading within the same scheduling database is desired but not required.

Where logic relationships are established, the detailed level of the schedule is the focal point of a project's scheduling system from which all scheduling reports are generated. The detailed critical path schedule is normally contained in a database that can be coded, sorted, or summarized to produce higher level schedules and specialized scheduling reports. Having the capability to selectively produce different types and levels of project schedule reports and graphic plots adds to the flexibility.

Technically significant events, such as design review completions, delivery of major equipment, regulatory or interagency commitments, etc., should be considered in developing milestones. Milestones should be selected with consideration given to the critical path.

Milestones are much like schedule activities in that too many may become unmanageable, and too few may not provide the required visibility. Milestones should be meaningful and be selected at time intervals that allow a consistent and thorough depiction of project progress. Milestones are an integral part of the project schedule database and are reportable to varying accountability levels. To allow traceability through the WBS from higher levels to lower levels, milestones contained in the schedule database should also have logic links to activities as appropriate, and should be coded to roll-up to selected WBS levels.

All known project and contract requirements, major procurements, milestones, and constraints should be identified for the planning and scheduling process. Activities external to the project that could reasonably be expected to impact the project should also be considered. All project work is scheduled using a formal, documented, consistent approach. The schedules should reflect planning by the appropriate technical experts as to how the activities will be accomplished. The initial schedule from which performance will be measured, developed at Critical Decision-1 (or an environmental clean up work plan), establishes the project schedule baseline, which includes project milestones. Modifications to the schedule baseline are subject to formal change control.

Establishing milestones at different levels of management control creates an integrated milestone hierarchy. That is, the lower-level milestones should be established to help measure schedule performance and to support upper-level milestones. The measurement of progress toward completing a high-level milestone is important and can be done with reasonably spaced lower-level milestones that depict interim schedule assessments. The range (or roll-up) includes low-level schedule and milestone tasks that support master schedule and milestone lists.

3.1.3 Cost Baseline Development

Cost baselines are developed to ensure budgets for labor, services, subcontracts, and materials are established at the proper levels and are "time-phased" in accordance with the project schedule. This ensures that the total project cost (TPC) is noted within the system and the project's direct costs and indirect costs are identified and managed.

Developing a control account structure that integrates with the WBS and facilitates collection of expense and capital costs by organization and cost element, as appropriate, establishes a process for controlling the opening and closing of control accounts for the life of the project.

Each control account includes technical, schedule, and budget requirements. That is, budget is estimated for the scope of work contained in the account, and time-phased in accordance with the project schedule. Time phasing of the budget in accordance with the schedule may be accomplished manually by the control account manager, or with a resource-loaded schedule network for complex projects. Time phasing of the resource requirements is performed in a manner that represents the way the resources will be accounted for when costs are incurred. The basis for the budget that is time-phased in the control account should be supported by, and reconcilable to, the cost estimate and schedule.

All work is represented in control accounts, and the sum of all control account budgets, contingency, reserves, and fee, equals the TPC or contract value, as appropriate.

A project's cost baseline is a budget that has been developed from the cost estimate and has been timed-phased in accordance with the project schedule. The cost baseline is referred to as a baseline since it's subject to formal monitoring and controls, and is integrated with the technical and schedule baselines.

Historically, DOE projects have not been adequately funded to complete the project without a cost deviation requiring a reprogramming action or a rescoping of the project. In order for DOE to establish a reputation for delivering projects within the cost baseline, the approach to developing a project PB must change. The accuracy of the estimate is a function of when the project is prepared in its life cycle. In the past, DOE projects were being baselined and validated at Conceptual Design. The amount of contingencies and reserves needed to increase success to the federally required performance standard has generally been too high to sell within DOE and Congress. This resulted in cutting the cost baseline to an arbitrary number, setting the project up for failure. The DOE Order 413.3 and DOE Manual 413.3-1 allow establishment of baselines at a realistic time in the project life cycle. Accuracy of the estimate performed by competent estimators will be the basis and support the project cost baseline.

Establishing adequate contingencies and reserves remains difficult to forecast as well as defend. The National Research Council "Progress in Improving Project Management at the Department of Energy 2001 Assessment" stated, "project budgets and contingencies should be based on risk assessments, that is, on probabilities." The report went on to say, "assuming that the uncertainty in the ultimate project cost can be described by a probability distribution, is some value that has been called the risk-adjusted cost estimate." A process evaluating the performance (technical) and schedule risks for each activity identified within the WBS is an excellent method to start building the probability distribution. Once the cost profile or cost probability distribution is established as described in the Risk Management Practice, they can be statistically combined using a Monte Carlo simulation. The probability curve generated by the Monte Carlo method

can be a tool used to establish the amount of contingency and reserves necessary to establish the PB. The Monte Carlo probability curve has been used to establish the PB at the 80% confidence level and the PMB at 50% to 60% confidence levels. This probability curve is developed systematically and can be an excellent tool. Utilization of this curve as the only input for contingencies and reserves will continue to result in PBs and PMBs that don't meet expectations.

In an article in the June 2003 Project Management Journal, "Schedule and Cost Buffer Sizing: How to Account for the Bias Between Project Performance and Your Model," the author, Larry Leach, states, "In reality, all project costs and activity durations are variable. In addition, project duration and cost estimates are uncertain in part due to the duration and cost variability, but also due to the estimate's limited ability to predict accurately the real variation. While modeling tools such as PERT, Monte Carlo, and critical chain make explicit attempts to model variation, project performance evidence (i.e., schedule and cost overrun) indicates that they frequently miss something." The article goes on to point out that biases invalidate the size of cost buffers (contingencies and reserves). These biases include omissions, merging of project activities, errors, team overconfidence, build-up on resource demands, special cause risk events, task performers delay until they feel pressure, failure to report rework, and level of efforts expanding with schedules. Adding up the impact of the biases will normally add more than 100 % to the estimate to recommend a PB that would not overrun. This is not the answer that's acceptable on most projects, but these factors must be considered when establishing the contingency and reserves.

Another article in the March 2003 Project Management Journal, "Cost Estimation Overruns in the North Sea," points out that North Sea Projects were overrunning costs on the average of 25%. These projects were being funded at the 50% confidence level based on a 50/50 symmetrical probability. The article recommends using an expected value cost estimate which results in an asymmetric uncertainty distribution (PMI PMBOK generally recommends a Beta distribution) and will result in a higher estimate being used to fund their projects.

The old method of establishing the PB and the Performance Measurement Baseline, using only the a probabilistic curve based on identified risks at a certain confidence level, will not result in the step change in cost and schedule performance required to change the DOE reputation. A combination of using risk based probability curves, statistical analysis, determining the impact of biases and utilization of Decision Analysis tools, must be used to establish the contingencies and reserves necessary to help ensure success. These recommendations will drive the PB and Performance Measurement Baseline higher and lengthen schedules, but the reality is that DOE cannot continue to understate baselines. The documentation and rationale must accompany Critical Decision-2, and the PD as well as the Acquisition Executive must be comfortable with the numbers.

Establishing sound baselines is only part of the answer. Contingency plans should be in place to give the PD flexibility to deliver the project within the baselines. This flexibility may include holding back scope and /or contracts on work that is not mandatory, always driving scope to minimum essential, continued evaluation of work to find a better way, and other good project management practices. The Integrated Project Team must be determined to deliver a quality project within established baselines. Large contingencies and reserves cannot be the answer for managing within baselines. Having baseline deviations more than 5% of the time for all projects is unacceptable

When combined with other cost baseline components, budgets are formed with unique purposes, as listed below:

1. When added together, the sum of all cost baseline components for all contracts equals the TPC.
2. The sum of the direct, indirect, contingency and management reserve, and undistributed budget, equals the total dollar amount allocated for the project/contract scope of work.

Project cost and schedule baselines provide the basis for multi-year work planning. These baselines are also used to generate annual budget cycle products, including Project Baseline Summaries, project data sheets, funding requests, Paths to Closure data, Internal Planning, Accountability, and Budget System-Information System data sheets, and so forth.

3.1.4 Baseline Change Control

Once the technical, schedule, and cost baselines are clearly defined, documented, and approved (Critical Decision-1 and -2), they are controlled through a formal and documented control management process. Project baseline changes below the threshold levels (see Section 7) need to have various levels of approval authority. The contractor may make contractor-level baseline changes without DOE approval, but these changes will be documented and provided to DOE, for information purposes, on a periodic basis as defined in procedures and stated in the Project Execution Plan (PEP).

Contractors and DOE should process and implement change requests in a timely manner. Contractors should not allow changes to performance data (control plan, earned value, costs, or schedule) that have not been recorded and reported for completed work. The only exceptions are to correct errors and make accounting adjustments. Contractors may internally re-plan future work when the replanning will result in more efficient or effective ways to perform the work—as long as no DOE milestones are unfavorably impacted or additional budget is required. Internal replanning is coordinated with and approved by the PD/PM. Such replanning is included in the next regularly scheduled project report.

3.2 Project Baseline Verification (Validation)

Baseline External Independent Reviews are to be conducted by personnel who are recognized as qualified in their respective fields of expertise and are outside the project organization. These reviews assess the reasonableness of the technical approach and project scope, schedule and cost baselines. They also assess the potential for schedule and/or cost improvement. The timing and scope of independent baseline reviews will depend on the type of project and the baseline element (technical, schedule, cost) being considered. An independent review of technical requirements, technical approach, and scope of a new project should be conducted before the baseline schedule and cost estimate are developed. Technical, scope, schedule and cost will all be reviewed at the same time for subsequent reviews or for a baseline change package. The need, frequency, and depth of each review will be established by considering minimum requirements for conducting specific reviews or by using a tailored approach to consider the maturity of scope definition, the nature of the activities being reviewed, and the risks associated with the baselines. All projects having a TPC greater than $5M will have an external independent review prior to receiving Critical Decision-2 approval.

The Office of Engineering and Construction Management will select the validation organizational team. A team or organization that's clearly independent of the business implications of the validation results will conduct the independent PB validation. For example, Headquarters Site Team members or Operations Office staff should not participate in the independent validation for their assigned sites, although they may participate as observers. The verification/validation team or organization should not have contributed to the development of the baseline or project planning documents, nor should it experience any positive or negative effects from the validation finding. PB external independent reviews will focus on (1) satisfying technical mission requirements, and (2) the reasonableness and validity of the baseline cost and schedule, by using appropriate estimating techniques and comparisons to benchmark costs where applicable. Outcomes of the review are discussed, negotiated, and then incorporated into the project baseline through the change control process.

External independent reviews are those used to verify the completeness and reasonableness of cost and schedule baselines and any other estimates or schedules used to analyze project alternatives or support management decisions. These reviews are typically performed before approving the cost and schedule information for use to support budgetary document or management decisions, and should be thoroughly documented for future reference.

The external independent review and validation processes are not intended to replace or duplicate the peer review processes and procedures of each contractor. Thorough and effective peer review, using personnel either internal or external to the contractor organization, is essential to ensure that all project baselines and baseline change requests submitted to DOE are reasonable, complete and accurate, and can withstand an independent review.

4.0 PERFORMANCE BASELINE OBJECTIVES AND THRESHOLDS

The PB is an essential element in the acquisition process. The PB is the Department's means of obtaining performance commitments and approval for a project from the entire acquisition organization, OMBE, and Congress. The PB identifies the performance requirements, schedule requirements, and cost requirements (TPC) for a project. All acquisition projects establish a PB that is approved by the Acquisition Executive as a part of Critical Decision-2.

The PB is defined by objectives and minimum threshold values that are converted into key parameters. The objectives values are established for performance, schedule, and cost, and represent the desired mission objectives. The threshold values are more conservative objectives for performance, schedule, and cost that represent the PB boundaries, and are the essence of the project's and the DOE's commitment to Congress. Key parameters are those commitments that, if the thresholds cannot be met, the Acquisition Executive would require a reevaluation of the concepts, design approaches, and acquisition strategy for an acquisition. These parameters, once defined and approved, become the Key Parameters (KPs) for a project.

5.0 KEY PARAMETERS

A KP is a vital characteristic of the project or facility mission. A KP is a characteristic, function, requirement, or design basis that, if changed, would have a major impact on the system or facility performance, schedule, cost and/or risk; or, the ability of an interfacing project to meet its mission requirements. A KP could be applicable either to the overall system/facility level as a whole, and/or to one or more major subsystems.

Parameters that are appropriate for KPs are those that express performance in terms of accuracy, capacity, throughput, quantity, processing rates, purity, or others that define how well a system, facility, or other project will perform.

The distinction between KPs and other technical and scope parameters is that KPs are objectives, or what the acquisition is expected to accomplish, and define what capability will exist at project completion. KPs represent the operational capability required to perform a specific mission and therefore are stated in terms of performing a function instead of a design parameter or specification. KPs are identified that reflect the minimum and/or maximum acceptable performance for the acquired capability at completion.

5.2 Cost Parameters

The cost parameters contained in the PB should identify the TPC and, in general, include direct costs such as research, development, test, construction, remediation, procurement, fabrication, services and items (equipment, design, etc.), transition and startup operations. Cost of quality, environmental, safety, and occupational health activities, as well as costs of acquisition items procured with operations and maintenance funds, may be included. Indirect costs not directly

attributable to the project but resulting from the project, including any infrastructure costs, also are included. Multiple key cost parameters may be developed, but at a minimum, KPs are established for the project TPC and Total Estimated Cost. The TPC is a parameter that cannot be exceeded without being classified as a breach and presented to the Secretarial Acquisition Executive for a decision to continue or terminate the project.

Cost estimates should initially reflect realistic and risk adjusted estimates of the TPC, including a careful and thorough assessment of risk. Budgeted amounts should not exceed the total cost objectives in the PB.

6.0 PERFORMANCE BASELINE PREPARATION, SUBMISSION, AND APPROVAL

The PB is submitted as part of the Critical Decision-2 package. The PB should be submitted to the Acquisition Executive for approval and authorization to continue the project (see Table 1). The approach taken depends on the project, but the essential requirement is to establish a PB that is fully achievable. From a historical perspective, establishing a PB early in a project's life cycle has been a key contributor to baseline growth.

Table 1. Performance Baseline Agreement

PERFORMANCE BASELINE AGREEMENT
_____ PROJECT

With the objective of enhancing project stability and controlling costs, we, the under-signed, submit this baseline document for approval. Our intent is that the project be managed within the performance, schedule and financial constraints identified. We agree to support the full required funding in the budget submission.

This PB summary does not provide detailed project requirements or content. It does, however, contain key performance, schedule, and cost parameters that are the basis for satisfying the identified mission need. The objectives as established in the PB are under change control, and as long as it is being managed within the thresholds established by this baseline, only Critical Decision-3 and Critical Decision-4 require approval by the Acquisition Executive.

[SIGNED) _____ DATE_____
Project Director

[SIGNED]_____ DATE_____
Assistant Secretary

[SIGNED]_____ DATE_____
Deputy Secretary of Energy

cc: OMBE

The application of risk adjustments (allowances) should be considered in developing a PB as being both prudent and necessary. The PB is risk assessed and adjusted for both durations and costs, providing a realistic, achievable PB commitment. Allowances are derived through analysis of the work scope being scheduled and estimated. This analysis includes technical, schedule, and cost risks as they apply to the Program/project efforts, and is used to account for the uncertainties existing in each component. At Critical Decision-2, the PB should be established with a high confidence level. However, if the established allowances are excessive, it's an indication that the PB is not sufficiently mature. Extreme care needs to be taken in establishing a premature PB.

A short list of recommendations concerning the process for determining and applying risk-adjustments includes:

- Ranges may be estimated at an activity level or at a summary level. Preferably, ranges are estimated as close to the activity level as possible.
- Allowances consider the varying degrees of risk associated with various activities.
- Allowances are not used to avoid the effort required to prepare a properly detailed and documented cost estimate or a detailed, resource-loaded schedule.
- Schedule and cost allowances may be developed for each project task, with the amount of allowance assigned to the various activities reflecting the importance, cost, and difficulty of the task. These individual allowances are used in developing the project schedule and building the cost estimate.
- A process allowance (or margin) is to be developed and included in project design, especially for those projects having process systems, equipment, valves, lines, and vessels. This allowance accommodates margins of error in process equipment sizing and a prudent amount of "surge" in the process systems.

Once the risk assessments for technical, schedule, and cost have been completed and allowances calculated, they are included in the TPC estimate. Allowances are a key item in supporting the PB at Critical Decision-2.

In establishing the PB, project completion should be clearly defined. A primary consideration is whether project completion is defined as system or facility turnover to the user, or if subsequent costs (operating, decontamination and decommissioning) are included in the overall performance baseline (life cycle approach). The PB should include a milestone dictionary that unambiguously defines all milestones, including project completion.

7.0 PERFORMANCE BASELINE DEVIATIONS

A deviation occurs when the PD has reason to believe that the current estimate of a project's performance, schedule, or cost parameter(s) is not or will not support the threshold value(s) for that KP(s). When a deviation occurs, the PD is to immediately notify the Secretarial Acquisition

Executive and the Acquisition Executive by memorandum with a copy to the Operations/Field Office Manager, Program Secretarial Officers, Under Secretaries, and OMBE. Within 30 days after a project deviation, the PD should notify the Acquisition Executive of the reason(s) for the project deviation and the actions that need to be taken to bring the project back within baseline parameters (if this information wasn't included in the original notification). Within 90 days after a project deviation occurs, one of the following should have taken place:

- The project is within PB parameters
- A new PB (changing only those parameters that breached and/or are unexecutable) has been approved by the Secretarial Acquisition Executive
- A Secretarial Acquisition Executive-level project review has been conducted with a recommended course of action.

In conducting the review, the Energy Systems Acquisition Advisory Board chairperson determines whether there is a continuing need for a project that is sufficiently behind schedule, over budget, or not in compliance with performance requirements, and recommends to the Secretarial Acquisition Executive suitable actions to be taken, including project termination. Any deviation that is a result of legislative or executive action—such as an appropriations act that modifies the funding or otherwise makes a constructive change in the project that results in a breach—should be deemed an administrative deviation. Any such action should be documented and administratively approved (no Energy Systems Acquisition Advisory Board or Energy Systems Acquisition Advisory Board-equivalent required) by the appropriate Secretarial Acquisition Executive/Acquisition Executive within 90 days of the time of the event precipitating the action. Subsequent to the action, any approved change in the PB will be updated in Project Assessment and Reporting System, and during the next budget cycle the Project Data Sheet. Administrative deviations will not be statistically recorded as deviations; however, parameter changes should be reflected in updates. The Project Deviation Report summarizes and provides limited analysis of the issue(s) in a one-page format, as depicted in Table 2.

Table 2. Project Deviation Report

PROJECT DEVIATION REPORT

Memorandum for Deputy Secretary of Energy
FROM: Project Director
SUBJECT: Project _____ Deviation Report

The _____ Project has deviated from its currently approved Performance Baseline, dated _____. This deviation is described as follows:

Analysis: The Integrated Project Team and I have prepared and attached a proposed change to the current Performance Baseline. We request your review and action on the proposed Performance Baseline as attached.

cc: OMBE
OECM
Program Support Project Offices
Under Secretary and/or NNSA Administrator